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ABSTRACT

Several intermediate performance objectives and corresponding criterion measures are listed for each of 10 terminal objectives for an intermediate automotive body repair and refinishing course. The materials were developed for a two-semester (3 hours daily) course for specialized classrooms, shop, and practical experiences designed to enable the student to develop additional skills needed for auto body repair and refinishing and to attain proficiency in basic skills. Instruction includes frame alignment equipment and techniques, color matching, paint mixing, spot painting, glass and trim replacement, use of technical manuals and parts catalogs, estimating, and use of forms. Practical work is emphasized. Students who complete course objectives are placed in the S.I.E. program for on-the-job training. The titles of the 10 terminal objectives sections are Human Relations and Safety, Estimating, Fiber Glassing, Replacing and Adjusting Auto Body Components, Electric Arc Welding, Glass Installation, Body and Frame Alignment, Spray Painting, Inventory, and S.I.E. Program. (This manual and 54 others were developed for various secondary level vocational courses using the System Approach for Education (SAFE) guidelines.) (HD)

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Automotive Body Repair

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PERFORMANCE OBJECTIVES

Intermediate Course

OE 010 978

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July, 1975

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AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

ACCREDITATION NUMBER: 9033

LENGTH OF COURSE: 2 Semesters

TIME BLOCK: 3 Hours Daily

COURSE DESCRIPTION

Specialized classroom, shop and practical experiences designed to enable the student to develop additional skills needed for auto body repair and refinishing and to attain proficiency in basic skills. Instruction includes frame alignment equipment and techniques, color matching, paint mixing, spot painting, glass and trim replacement, use of technical manuals and parts catalogs, estimating and use of forms. Practical work is emphasized. Students who complete course objectives are placed in the S.I.E. program for on-the-job training.

AUTOMOTIVE BODY REPAIR & REFINISHING - INTERMEDIATE

Syllabus of Terminal Performance Objective:

16.0 - Human Relations & Safety

17.0 - Estimating

18.0 - Fiber Glassing

19.0 - Replacing and Adjusting Auto Body Components

20.0 - Electric Arc Welding

21.0 - Glass Installation

22.0 - Body and Frame Alignment

23.0 - Spray Painting

24.0 - Inventory

25.0 - S.I.B. Program

COURSE AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE OBJECTIVE NO. 16.0

HUMAN RELATIONS AND SAFETY

Upon completion of the unit of instruction on Human Relations and shop safety, 90% of the students will demonstrate, through 80% correct response on a criterion test, objective knowledge of human relations and shop safety.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		16.0	Test attached.
16.1	The student will explain in writing or orally with 80% accuracy the function of a school shop foreman's assignment and routine.	16.1	Explain a school shop foreman's assignment, include the following: 1. starting and dismissal time of class 2. shop clean-up 3. student locker regulations 4. tool room procedures 5. restroom procedures
16.2	The student will demonstrate his ability by preparing for and carrying out a job interviews using VICA standards. The verbal response during interview will be 80% accurate.	16.2	Prepare for and carry out a job interview, include the following: 1. punctuality 2. grooming 3. attitude 4. correct verbal responses
16.3	The student will list five different ways of having an eye injury in the shop with 100% accuracy.	16.3	List five different ways of having an eye injury occur in the shop. 1. _____ 2. _____ 3. _____ 4. _____ 5. _____

TPO 16.0 - AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

HUMAN RELATIONS AND SAFETY

1. Paint and thinner should always be kept in closed containers.
   True or False

2. What material can be used to extinquish lacquer, gasoline, grease and thinner fires?
   a. water
   b. carbon tetrachloride

3. Why should the starting battery be disconnected on vehicles after they have been in a collision?

4. Files may be used as pry bars.
   True or False

5. It is always advisable to stand in the plane of rotating parts.
   True or False

6. Upon leaving a welding outfit the tank valves should be closed.
   True or False

7. What affect will oil or grease have on any connection on a welding outfit?

8. On most welding equipment there is no danger of interchanging the oxygen and acetylene hose.
   True or False

9. What is the name of the tool used most commonly for lighting a gas welding torch?

   _____

10. All electrical units used in the automotive body shop should be grounded.
    True or False

COURSE AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE OBJECTIVE NO. 17.0

ESTIMATING

The trainee will demonstrate his knowledge and ability with 80% accuracy to use a flat rate manual as it relates to the time required to do a job, price of parts, and proper identification of auto body parts by making estimates of various given dented panels.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		17.0	Test attached.
17.1	The student will with 80% proficiency use the flat rate manual to time the removal and replacement of auto body parts.	17.1	Make a list of 20 panels and the time necessary to remove and replace them on five different model automobiles by using the flat rate manual.
17.2	The student will with 80% accuracy use the flat rate manual to price parts of the body.	17.2	Make a list of 20 auto body parts and the cost of each part on five different automobiles by using the flat rate manual.
17.3	Given estimate forms and a wrecked automobile the trainee will with 80% proficiency write a complete estimate by using the flat rate manual for the cost of labor and parts.	17.3	1. Take a flat rate manual and estimate forms and make a carbon copy of a complete estimate of a wrecked automobile given a total including the current rate of state tax. 2. Explain the time given in the flat rate manual.

TPO 17.0 - AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

ESTIMATING

1. Should a requisition system be used in a shop?
   Yes or No

2. Is it better to employ top-notch tradesmen rather than mediocre employees?
   True or False

3. The main factors to be considered in making an estimate are flat rate time and _____.

4. The hour in the flat rate manual is divided into:

   a. ten parts of six minutes
   b. two parts of thirty minutes
   c. five parts of twelve minutes
   d. twenty parts of three minutes

5. The cost to replace a panel usually doubles the cost of repair of that same panel.
   True or False

6. Is it necessary to keep a stock record and rotation system?
   Yes or No

7. It is not important to have the damaged car owner's name and address.
   True or False

8. Some parts on an automobile made by the same manufacturers tend to be interchangeable.
   True or False

9. What is a sublet?

10. The tag number, make, model, styling and body number should be included on an estimate for easy reference in finding parts.
    True or False

COURSE AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE OBJECTIVE NO. 18.0

FIBER GLASSING

Upon completion of the unit of instruction on fiber glassing, 80% of the students will demonstrate through 80% correct responses on a criterion test and will repair and replace sections in a fiber glass body.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		18.0	The student will correctly repair crack in right rear quarter panel. (Test attached)
18.1	Give a list of materials needed for repairing fiber glass bodies, the trainee will with 100% accuracy identify six materials.	18.1	A. Identify six materials needed for repairing fiber glass bodies. 1. polyester resin 2. polyester filler 3. catalyst 4. fiber glass cloth 5. fiber glass powder 6. chopped fibers 7. fiber glass bonding strips 8. epoxy resin
18.2	Given the necessary information and materials, the trainee will with 80% accuracy repair a hole in a fiber glass panel.	18.2	1. Remove the damaged material. 2. Prepare the surface for fiber glass. 3. Fill the damaged area with the proper mixture of resin and fiber glass. 4. Allow the activated resin to cure and harden. 5. Finish by leveling and sanding. 6. Use all safety precautions when working with fiber glass.

TPO 18.0 - AUTOMOBILE BODY REPAIR AND REFINISHING - INTERMEDIATE

FIBER GLASSING

1. A fiber glass body has high resistance to impact.
   True or False

2. Fiber glass panels are not available for replacement.
   True or False

3. The resin used in making fiber glass repairs may irritate the skin.
   True or False

4. Why is it advisable to use a belt sander when sanding fiber glass?

   a. it cuts faster
   b. a vacuum attachment can be used to draw in the dust
   c. conforms to the curves of the body more accurately

5. Catalyzed resin should not be left to stand too long because:

   a. it dries and hardens quickly
   b. chemical action results in rapid heat build up and is therefore a fire hazard
   c. it evaporates quickly

6. It is not necessary to clean the surface before applying fiber glass repairs.
   True or False

7. After fiber glass patch has hardened, what grit abrasive should be used first?

   a. 80 grit
   b. 180 grit
   c. 16 grit

8. Catalyzed resin should not be left standing too long as the chemical action results in rapid heat build-up and therefore is a fire hazard.
   True or False

9. Resin mixtures should be used only in well ventilated areas, as the mixture produces toxic fumes.
   True or False

10. It is recommended to apply a protected cream to the hands, or preferably to use rubber gloves when working with the resin, or filler and hardener.
    True or False

COURSE AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE OBJECTIVE NO. 19.0

REPLACING AND ADJUSTING AUTO BODY COMPONENTS

Upon completion of this unit, 80% of the trainees will align right and left front fenders, grille assembly, hood, trunk lid and doors with 80% accuracy as to manufacturer's specifications and 80% correct response on a criterion test.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		19.0	The student will correctly align right and left front fenders, grille assembly, hood, trunk lid and doors. (Test attached)
19.1	The trainee will select eight correct parts of a typical automobile front end with 80% accuracy.	19.1	Select eight correct parts of a typical front end. a. fender inner skirt b. hood panel assembly c. front fender d. core support assembly e. hood hinge assembly f. hood spring g. rocker panel h. head light assembly i. front bumper assembly j. gas tank assembly k. quarter panel
19.2	The trainee will demonstrate his understanding of the grille, hood and trunk lid adjustments by removing, replacing and adjusting with 80% proficiency.	19.2	On the automobile provided by the instructor: a. select the proper tools b. observe safety rules c. remove and replace the hood and trunk lid d. adjust the hood and trunk lid for proper clearance against all adjacent panels e. secure all nuts and bolts to factory specification f. align the grille with adjacent panels and parts of the front end assembly

COURSE AUTOMOTIVE REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE OBJECTIVE NO. 19.0 (cont'd) REPLACING AND ADJUSTING AUTO BODY COMPONENTS

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
19.3	The trainee will answer given questions concerning doors and fenders and will align given fender and door adjustments with 80% accuracy.	19.3	1. Explain the relationship between the door and fender. 2. What is a stricker plate? 3. Explain the purpose of the door hinge. 4. Remove and replace a front door. 5. Align the door with the front fender and adjacent panels.

TPO 19.0 - AUTOMOBILE BODY REPAIR AND REFINISHING

REPLACING AND ADJUSTING AUTO BODY COMPONENTS

Listed below each numbered item are four possible answers or completing phrases. Decide which of the four is correct or most nearly correct; then write the corresponding number in the blank space to the right of that item.

1. In general, the gap between the hood and adjacent panels should not exceed:

   a. 1/8"
   b. 1/4"
   c. 3/8"
   d. 1/2"

2. If the gap between the hood and the cowl is too narrow, the repairman should adjust the:

   a. hinges
   b. firewall
   c. fender height
   d. rubber bumpers

3. A likely result of installing the hood with too narrow a gap at the cowl is damage to the:

   a. cowl finish
   b. inner panel
   c. hinges
   d. grille

4. Using a jack to straighten a hood or deck lid place on the car is likely to result in damage to the:

   a. inner panel
   b. outer panel
   c. jack
   d. hinges

5. Before using a hydraulic jack or a 2 x 4 level to correct a high or low fender in fitting a hood, the mechanic must:

   a. remove the hood
   b. loosen the hood hinges
   c. loosen the fender - attachment bolts
   d. tighten the fender - attachment bolts

6. Before loosening the hood-to-hinge bolts in removing a hood, the mechanic should:

   a. increase tension on the hinge springs
   b. mark the outline of the hinge on the hood
   c. rough out major hood damage
   d. align the hood opening

7. Achieving a good fit when installing a new or repaired hood will be impossible if:

   a. the hinge springs are weak
   b. a holding unit is not used
   c. the frame of the car is misaligned
   d. the gap around the hood exceeds 1/8"

8. The best method of straightening a damaged door is to do the roughing out with the door:

   a. closed
   b. open
   c. in a holding unit
   d. cut at the belt line

9. The function of the striker plate is to:

   a. limit up-and-down movement of the door
   b. hold the door closed
   c. spring the door open
   d. limit window travel

10. List 3 panels that are usually adjacent to the grille.

   a. _____
   b. _____
   c. _____

COURSE AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE OBJECTIVE NO. 20.0

ELECTRIC ARC WELDING

Upon completion of this unit, 75% of the trainees will make an arc welding set up and properly adjust correct heat ranges using all safety precautions, make a satisfactory weld in the flat, horizontal and vertical positions with 80% accuracy.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		20.0	The student will set up and properly adjust heat ranges and using the electric arc welder the student will weld a butt weld in the flat, vertical and horizontal positions with 75% accuracy as judged rating scale.
20.1	The trainee will with 100% accuracy select five out of a list of eight items necessary to make an electric welding set up and correct adjustments.	20.1	Select five of eight items necessary to make an electric weld. 1. welding shield 2. leather gloves 3. positive electric cord 4. negative electric cord 5. coated electrode 6. electric arc welder 7. practice metal 8. welding torch
20.2	Given a current value chart, the student will with 100% proficiency select the correct amperage range for the thickness of metal.	20.2	CURRENT VALUE CHART

METAL THICKNESS	ROD SIZE (IN INCHES)	AMPERAGE RANGE
Light gauge sheet metal up to approximately 7/64" thick.	1/16	10-30
	5/64	25-45
	3/32	40-70
Mile steel up to approximately 3/16" thick.	1/8	50-130
	5/32	90-180
	3/16	130-230
Mile steel up to approximately 5/16" thick. (frames, etc.)	1/8	60-120
	5/32	90-160
	1/4	190-300
	3/16	120-200

COURSE AUTOMOBILE BODY REPAIR AND REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE OBJECTIVE NO. 20.0 (cont'd) ELECTRIC ARC WELDING

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
20.3	Given an electric arc welding face shield 100% of the students will use the safety shield with 100% accuracy as listed in the criterion measures.	20.3	1. Select a complete welding shield. 2. Make sure the correct welding lens is inserted in the shield. 3. Wear the welding shield at all times while welding. 4. Raise the shield only when the arc has stopped.
20.4	The trainee will make a flat horizontal and vertical electric arc weld with 80% accuracy.	20.4	1. How is the arc started? 2. Where arc welding can be used, what are the primary advantages? 3. What is a DC welder? 4. What is an AC welder? 5. Why should the operator always wear the proper mask when arc welding?

ELECTRIC ARC WELDING

1. The usefulness of arc welding for sheet metal repair is limited by the:

   a. weight of the equipment
   b. difficulty of filling wide openings
   c. heat distortion produced
   d. difficulty of rewelding seams

2. The electric arc welder most often found in auto body repair shops is the:

   a. transformer - type A-C welder
   b. generator - type D-C welder
   c. heliarc welder
   d. TIF welder

3. What type electrode is most commonly used in arc welding operations in auto body repair shops?

   a. bare
   b. coated
   c. carbon
   d. nonconsumable

4. Safety codes require that electric welders and all other portable electric tools and equipment be:

   a. fused
   b. grounded
   c. inspected yearly
   d. equipped with interlock switches

5. What gives the heat to the arc to melt the metal?

   a. voltage
   b. amperage
   c. watts
   d. metal

6. What is slag?

7. What is a chipping hammer?

8. What is a butt joint?

9. What is a lap joint?

10. What is bead?

COURSE AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE OBJECTIVE NO. 21.0 GLASS INSTALLATION

Upon completion of this unit of instruction, the students will remove and install front and rear windshields, door and vent glass with 80% accuracy as judged by rating scale.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		21.0	The student will correctly remove and reinstall front windshield, back glass, door glass, and vent glass with 80% accuracy.
21.1	The student will orally identify and explain five of eight steps in removing and replacing front and rear windshield with 80% proficiency.	21.1	Identify and explain orally five of eight steps in removing and replacing front and rear windshields. 1. Remove the garnish molding. 2. Break out the old glass. 3. Remove the weather strip. 4. Cover the instrument panel. 5. The molding clips should be checked before the glass is installed. 6. If the removed glass is to be used again, it should be laid on a protected bench. 7. Cut the adhesive caulk material (short method). 8. Cut the adhesive caulk material (long method).
21.2	The student will with 80% accuracy remove and replace a windshield on a practice automobile.	21.2	1. List two types of windshields. 2. What is piano wire used for? 3. T F - Some windshields are installed with a pull cord. 4. When and why should glass spacers be used? 5. Will single strength safety plate glass observe the safety cord in the front windshield? Yes or No
21.3	The student will with 80% accuracy remove and replace a door and vent glass.	21.3	1. What is a division bar? 2. T F - The front door on all automobiles have a vent assembly and a window assembly. 3. Select five of eight parts of a door glass assembly. a. window assembly b. stabilizer strips c. trim pad adjusting plates d. front guide

COURSE AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE OBJECTIVE NO. 21.0 (cont'd) GLASS INSTALLATION

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		21.3	e. window regulator f. adjustable remote controls to lock rod g. door lock h. lower sash channel cam

TPC 21.0 - AUTOMOTIVE BODY REPAIR AND REFINISHING

GLASS INSTALLATION

1. The older type of windshield on fisher bodies were installed with a cord.
   True or False

2. Should a windshield opening be checked with checking blocks after a vehicle has been rolled over?
   Yes or No

3. Steel music wire is used to remove the glued windshield.
   True or False

4. What type of lubricant is used in lock cylinders?

5. Describe how a side window glass is removed and reinstalled to the channel.

6. What is the function of the weather strip on windshield and rear window glass other than to keep out the weather?

7. In most automobiles, the movable glass travels in:

   a. aluminum channels
   b. felt channels
   c. rubber grooves
   d. roller tracks

8. In some cars, the vent window is an integral part of the inner panel.
   True or False

9. Tempered glass windows are sized, shaped and edge finished at the factory.
   True or False

10. Stationary quarter glass is generally installed by the same method as:

    a. two-piece back glass
    b. door glass
    c. vent glass
    d. the windshield

STUDENT RATING SHEET

SHOP

DATE

RATED BY

(Check only one item under each trait)

ACCURACY OF WORK:
1. Makes many errors
2. Is careless
3. Is fairly accurate
4. Is careful
5. Is very accurate

CARE OF WORKING SPACE:
1. Very untidy
2. Careless
3. Just passable
4. Keeps space clean
5. Space very clean and orderly

HANDLING OF TOOLS AND EQUIPMENT:
1. Rough
2. Careless
3. Indifferent
4. Careful
5. Very Careful

SPEED:
1. Very slow
2. Slow
3. Ordinary
4. Fast
5. Very fast

USE OF WORKING TIME:
1. Very wasteful
2. Loafs with others
3. Passable
4. Busy
5. Very busy

USE OF MATERIALS:
1. Wasteful
2. Careless
3. Fair
4. Good
5. Very careful

RESPONSIBILITY:
1. Buck-passer
2. Evades Responsibility
3. Passable
4. Likes it
5. Seeks it and handles it well

No valid reason

INITIATIVE:
1. Doesn't exhibit any
2. Very little
3. Average
4. Offers many suggestions
5. Very original

ATTANDANCE:
1. Off a great deal *
2. Off occasionally *
3. Off occasionally, valid reason
4. Seldom off
5. Never tardy

ATTITUDE TOWARD CO-WORKERS:
1. Does not get along
2. Looks down on them
3. Neutral
4. Good
5. Well liked, very cooperative

ATTITUDE TOWARD INSTRUCTOR
1. Disrespectful
2. Does not cooperate
3. Average
4. Cooperates
5. Very respectful, helpful

OBSERVANCE OF SAFETY RULES:
1. Disregards rules openly
2. Disregards rules when not watched
3. Average
4. Observes rules
5. Observes rules, has own rules

ACCIDENT RECORD:
1. Many accidents through carelessness
2. Minor injuries through carelessness
3. Few minor injuries
4. Seldom injured
5. Never gets injured

PERSONAL APPEARANCE, CLEANLINESS:
1. Slovely and dirty
2. Untidy
3. Fair
4. Neat and clean
5. Exceptionally pleasing

COURSE AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE OBJECTIVE NO. 22.0

BODY & FRAME ALIGNMENT

Upon completion of this unit of instruction, the student will check an automobile body for alignment with tram rod and steel measuring tape with 80% accuracy.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		22.0	The student will accurately check the automobile body for alignment using tram rod and steel measuring tape with 80% accuracy using attached rating scale.
22.1	The student will with 100% proficiency select the proper tools for checking a frame and body for alignment.	22.1	1. Center line gauges places between frame members will reveal a: a. shifted axle housing b. broken cross member c. centerline skew d. diamond frame 2. When a car with correct frame and body alignment is under normal load, the center section of the frame should be: a. level b. tilted forward 2 degrees c. tilted backward 2 degrees d. boved in the center 3. A tram rod is a: a. long, light bar with upright pointers b. straightedge with a dial indicator c. light wooden pattern of the frame d. calibrated steel tape 4. Most frame-alignment checks are made with: a. a steel tape b. the quarter panels removed c. the frame in the vehicle d. optical equipment

COURSE AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE OBJECTIVE NO. 22.0 (cont'd) BODY & FRAME ALIGNMENT

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
22.2	Given two questions concerning body alignment and measurements the learner will answer both in writing with 80% accuracy.	22.2	1. When an automobile has been damaged on both sides it is rather difficult to align the body because both sides are out of alignment. In such a case the correct measurements are obtained from: _____ _____ _____ 2. If the two opposite diagonal measurements are not the same, it indicates that the body is: _____ _____ _____

TPO 22.0 - AUTOMOTIVE BODY REPAIR & REFINISHING - INTERMEDIATE

BODY & FRAME ALIGNMENT

1. Describe how a badly damaged body is aligned.

2. Steering control can be seriously affected from frame or underbody misalignment.
   True or False

3. When a car with correct frame and body alignment is under normal load, the center section of the frame should be level.
   True or False

4. A Tram gauge is a:

   a. long, light bar with upright pointers
   b. straightedge with a dial indicator
   c. light wooden pattern of the frame
   d. calibrated steel tape

5. Most frame alignment checks are made with:

   a. steel tape
   b. the quarter panels removed
   c. the frame in the vehicle
   d. optical equipment

6. Why should all frame and underbody misalignment be corrected before body repairs are completed.

   a. to simplify the fitting of new body parts
   b. to ensure smooth operation of doors, hood, and deck lid
   c. to prevent costly rework
   d. for all the above reasons

7. How is the strength of large metal sheets or panels affected by angles or flanges formed along their edges?

   _____
   _____

8. How is box construction in connection with frames obtained?

   _____
   _____

9. What is the panel called which is used behind the front bumper and under the grille?

   _____

10. Does an automobile body derive most of its strength from the panel or the inner construction?

_____

COURSE AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE
OBJECTIVE NO. 23.0 SPRAY PAINTING

Upon completion of this unit of construction, 90% of the students will spray paint lacquer and enamel materials with 80% accuracy and will complete a written test on spray painting with 80% proficiency.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		23.0	Test attached.
23.1	The student will answer criterion measure questions on atomization and vaporization of paint materials and explain the spray gun distance with 100% accuracy.	23.1	1. T F Atomization is the process of breaking up the solids in the paint and depositing these solids on the surface in the form of tiny spheres. 2. T F Vaporization is the gassing off of the thinners or reducers in the paint, a process that takes place between the gun and the surface being coated. 3. Explain the basic rule in spray painting as it relates to spray gun distance from the surface. 4. F A good guide to correct spray gun distance is to use the span of a man's hand, which is about 8 inches.
23.2	The student will demonstrate with 80% accuracy according to the rating chart how the spray gun is used.	23.2	1. Explain the following terms as they relate to spray painting. a. distance b. perpendicular c. stroking and triggering d. overlapping e. straight line movement f. arcing

COURSE AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE OBJECTIVE NO. 23.0 (cont'd) SPRAY PAINTING

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		23.2	2. See rating sheet. 3. Demonstrate against a panel or paper covered area how to properly use a spray gun.
23.3	The student will explain with 100% accuracy the differences in automotive paint materials.	23.3	1. Explain the following types of automotive materials. a. lacquer (acrylic) b. enamel (acrylic) c. enamel (synthetic) d. lacquer (nitrocellulose) 2. What characteristics the volatile material in automotive paint? a. coloring material b. it evaporates quickly

23.0 - PERFORMANCE TEST

DIRECTIONS: Set up the equipment, prepare given metal and spray a lacquer finish on one panel and an enamel finish on one panel.

23.0 - WRITTEN TEST

1. Synthetic enamels dry in what manner?

   a. evaporization only
   b. evaporization and polymerization
   c. polymerization only

2. The major advantage of acrylic lacquer over nitrocellulose lacquer is superior gloss retention.
   True or False

3. Lacquer is said to dry from the outside in.
   True or False

4. What characterizes the volatile material in automotive paint?

   a. coloring material
   b. it evaporates quickly

5. Primer surfaces are used to provide adhesion.
   True or False

6. What is the purpose of a tack rag?

   a. it is used to wipe off dust from the surface immediately before spraying
   b. special rag used for holding upholstery tacks
   c. special cloth used to wipe off spray gun

7. Is acrylic recommended for use on cars originally finished in lacquer?
   Yes or No

8. Gascline may be used to remove traces of wax and grease from surface.
   True or False

9. It is not necessary to thoroughly stir the paint before using.
   True or False

10. Can spraying technique affects the tone of the color being sprayed.
    Yes or No

COURSE AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE OBJECTIVE NO. 24.0

INVENTORY

Upon completion of this unit of instruction, 100% of the students will exhibit 100% proficiency in maintaining a perpetual inventory of instructional supplies, tools and equipment.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		24.0	See attached rating scale.
24.1	The student will inventory assigned tools and instructional supplies at the end of each work day with 100% accuracy.	24.1	Inventory the assigned tools and instructional supplies at the end of each work day.

STUDENT RATING SHEET

SHOP

DATE

RATED BY

(Check only one item under each trait)

ACCURACY OF WORK:
1. Makes many errors
2. Is careless
3. Is fairly accurate
4. Is careful
5. Is very accurate

CARE OF WORKING SPACE:
1. Very untidy
2. Careless
3. Just passable
4. Keeps space clean
5. Space very clean and orderly

HANDLING OF TOOLS AND EQUIPMENT:
1. Rough
2. Careless
3. Indifferent
4. Careful
5. Very Careful

SPEED:
1. Very slow
2. Slow
3. Ordinary
4. Fast
5. Very fast

USE OF WORKING TIME:
1. Very wasteful
2. Loafs with others
3. Passable
4. Busy
5. Very busy

USE OF MATERIALS:
1. Wasteful
2. Careless
3. Fair
4. Good
5. Very careful

RESPONSIBILITY:
1. Buck-passer
2. Evades Responsibility
3. Passable
4. Likes it
5. Seeks it and handles it well

No valid reason

INITIATIVE:
1. Doesn't exhibit any
2. Very little
3. Average
4. Offers many suggestions
5. Very original

ATTANDANCE:
1. Off a great deal *
2. Off occasionally *
3. Off occasionally, valid reason
4. Seldom off
5. Never tardy

ATTITUDE TOWARD CO-WORKERS:
1. Does not get along
2. Looks down on them
3. Neutral
4. Good
5. Well liked, very cooperative

ATTITUDE TOWARD INSTRUCTOR
1. Disrespectful
2. Does not cooperate
3. Average
4. Cooperates
5. Very respectful, helpful

OBSERVANCE OF SAFETY RULES:
1. Disregards rules openly
2. Disregards rules when not watched
3. Average
4. Observes rules
5. Observes rules, has own rules

ACCIDENT RECORD:
1. Many accidents through carelessness
2. Minor injuries through carelessness
3. Few minor injuries
4. Seldom injured
5. Never gets injured

PERSONAL APPEARANCE, CLEANLINESS:
1. Slovely and dirty
2. Untidy
3. Fair
4. Neat and clean
5. Exceptionally pleasing

COURSE AUTOMOTIVE BODY REPAIR AND REFINISHING - INTERMEDIATE

TERMINAL PERFORMANCE
OBJECTIVE NO. 25.0

S.I.E. Program

The learner will demonstrate 80% proficiency in all of the basic and intermediate course objectives with a minimum of 540 hours and will display good work habits and attitudes as determined by the instructor before being assigned to the S.I.E. programs.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
25.0	The student will demonstrate his ability by having successfully completed and passed criterion tests and job assignments with 80% accuracy during two years of high school with a minimum of 540 hours of theory and practical shop experience.	25.0	Complete the basic and intermediate course objectives in automobile body repair and refinishing trade with 80% proficiency and 540 shop hours.